

REMARKS

Introduction

This Reply is in response to the Office Action of May 19, 2005. Reconsideration of this application in view of the following remarks is respectfully requested.

Claims 19 and 20

In the Office Action, claims 19 and 20 were rejected as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. This has been done by placing claims 19 and 20 in independent form incorporating all of the features of claim 18, from which claims 19 and 20 formerly depended. Claims 19 and 20 are therefore in condition for allowance.

Claims 1-5 and 18

Claims 1, 4, and 18 were rejected under 35 U.S.C. §102(e) as being anticipated by Okuno (U.S. Patent 6,803,634). Claims 2 and 3 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Okuno in view of Furukawa (US 2003/0104658). Claim 5 was rejected under 35 U.S.C. §103(a) as being

unpatentable over Okuno in view of Iranmanesh (EP 0 450 376).

These rejections are respectfully traversed.

Applicants' invention relates to integrated circuits containing MOS transistors and bipolar transistors. A self-aligned geometry is used in which each bipolar transistor's emitter and collector are laterally separated by a distance equal to the base width. Conventional designs of this geometry are subject to high base resistances. With applicants' invention, however, this potential problem is addressed by providing each bipolar transistor with a base conductor that runs parallel to the base region separating the emitter and collector. As explained in applicants' specification at page 5, line 28 to page 6, line 3, the base conductor forms a low-resistance parallel current path into the base region. The presence of the base conductor therefore reduces base resistance and improves bipolar performance.

The cited Okuno patent uses a different bipolar geometry. In Okuno's bipolar transistor, the bipolar emitter is formed by n+ region 49. The collector is formed from n+ contact region 51, lightly-doped n region 37, and n+ region 36. The base is formed from p+ contact region 50 and lightly doped p region 48. This geometry does not have a collector and emitter that are separated by distance along the substrate surface that

is equal to the base width. The collector and emitter are arranged vertically.

Applicants have amended claims 1 and 18 to make this distinction clearer. As amended, claims 1 and 18 specify how the emitter and collector in applicants' bipolar transistor are separated by a distance along the surface of the substrate equal to the base width.

Moreover, applicants have amended claims 1 and 18 to make it clear that the base conductor is connected to the base region along its entire length.

Okuno's aluminum contacts 47, in contrast, form electrical contacts with underlying silicon only through discrete square contact holes in oxide 46 (see, e.g., FIGS. 8A-8D).

In view of the foregoing, claims 1 and 18 are in condition for allowance. Claims 2-5 depend from claim 1 and are allowable because claim 1 is allowable.

Conclusion

The foregoing demonstrates that claims 1-5 and 18-20 are patentable. This application is therefore in condition for

allowance. Reconsideration and allowance of the application are respectfully requested.

Respectfully submitted,

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